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PUB-NO: GB002316961A

DOCUMENT-IDENTIFIER: GB 2316961 A

TITLE: Two part spacer for positioning reinforcing rods in concrete

PUBN-DATE: March 11, 1998

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APPL-NO: GB09617984

APPL-DATE: August 29, 1996

PRIORITY-DATA: GB09617984A (August 29, 1996)

INT-CL (IPC): E04C005/16

EUR-CL (EPC): E04C005/20 ; E04C005/16

(12) UK Patent Application (19) GB (11) 2 316 961 (13) A

(43) Date of A Publication 11.03.1998

(21) Application No 9617984.1

(22) Date of Filing 29.08.1996

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(51) INT CL⁶

E04C 5/16

(52) UK CL (Edition P)

E1D DPR D401

(56) Documents Cited

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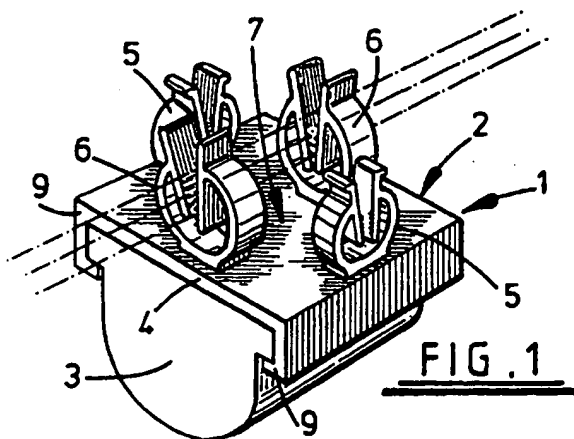
(58) Field of Search

UK CL (Edition O) E1D DPR

INT CL⁶ E04C 5/16

(54) Two part spacer for positioning reinforcing rods in concrete

(57) A spacer assembly (1) for positioning reinforcing rods prior to setting in concrete comprises a one-piece moulded plastic support head (2) and a slidably attachable spacer body (3). The head (2) comprises a rectangular platform (4) on which are located a first pair of aligned clips (5) and a second pair of clips (6) set at right angles thereto. A reinforcing rod can be held either by clips (5) or clips (6) but not by both. The clips fit onto the rods by a resilient push fit. The platform (4) has a pair of depending, downwardly extending, opposed L-shaped limbs (8) defining channels in which ledges (9) of the spacer body (3) are slidably received.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

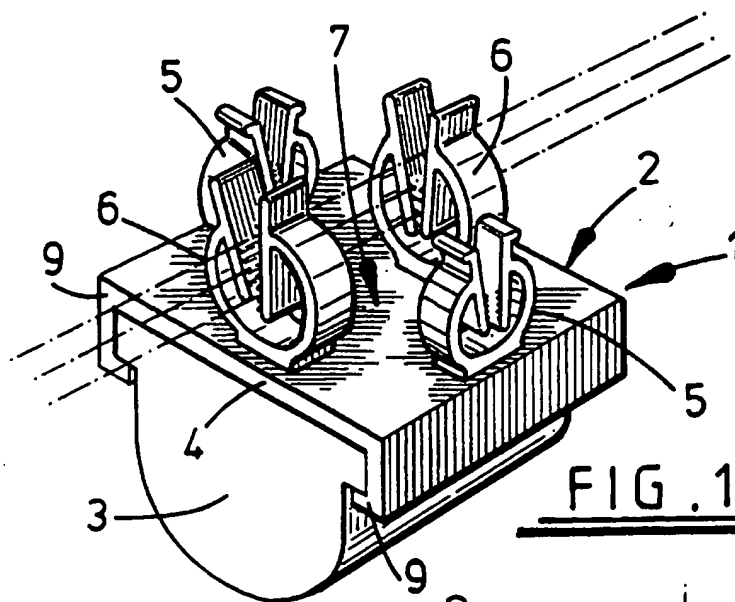


FIG. 1

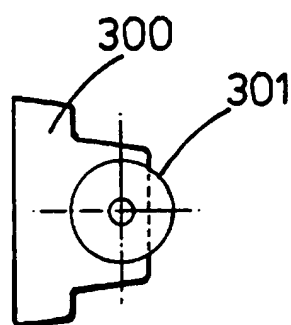


FIG. 9

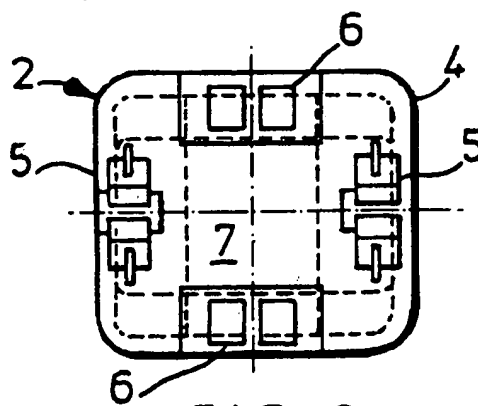


FIG. 2

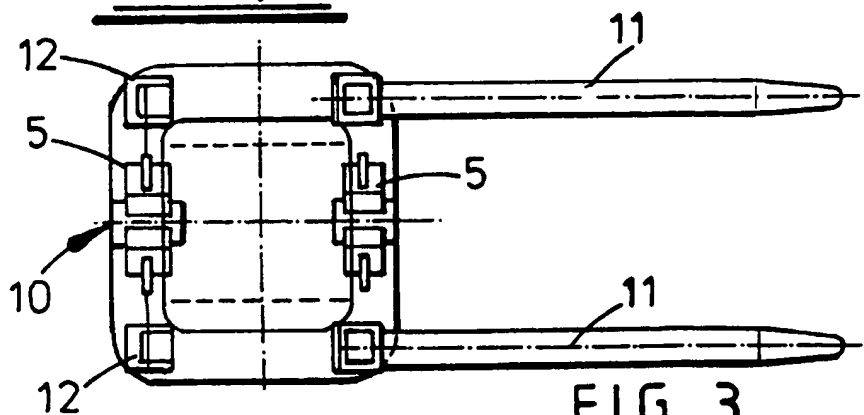
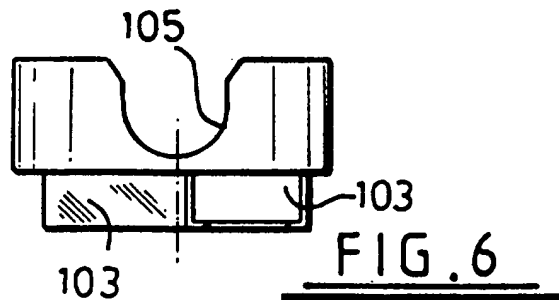
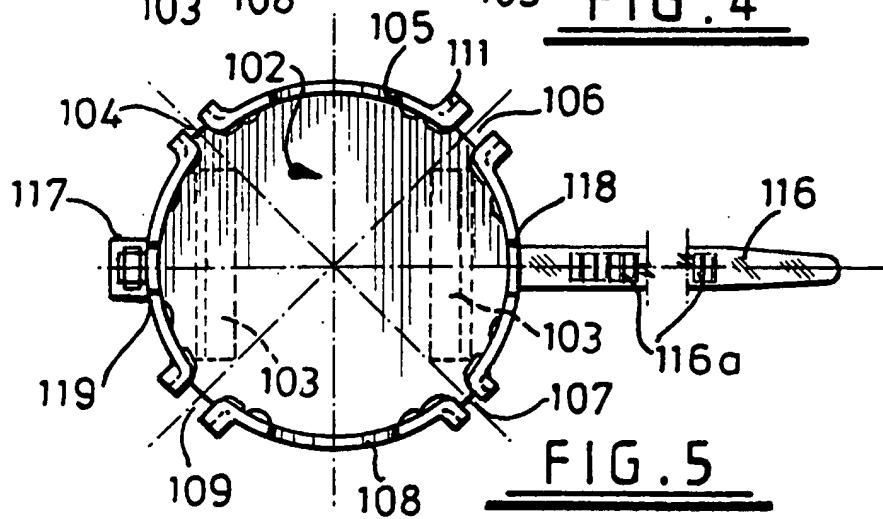
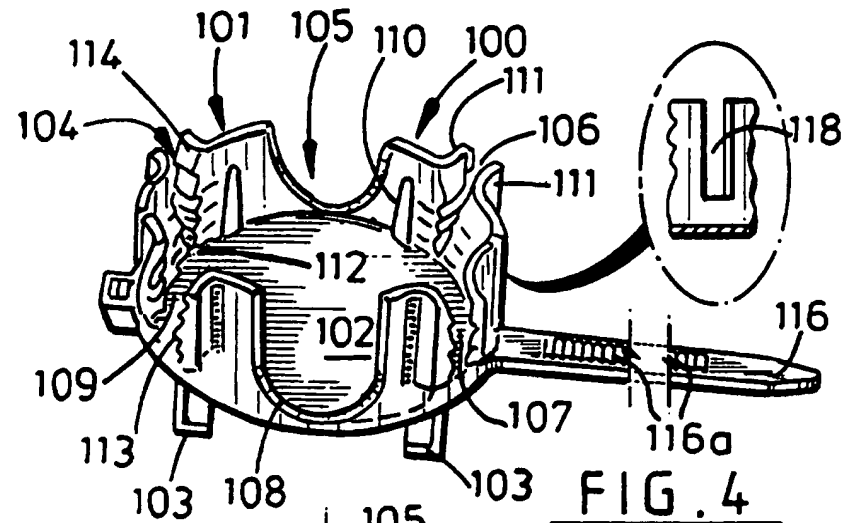


FIG. 3



3-3

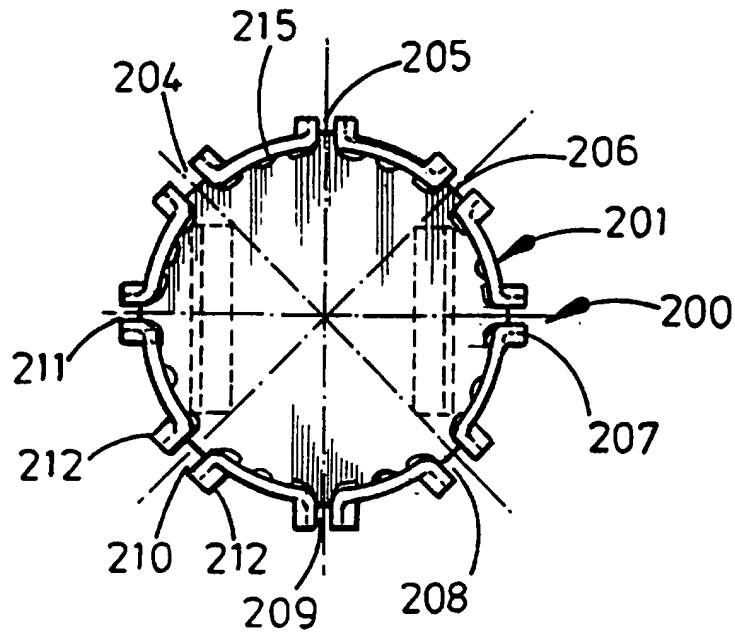


FIG. 7

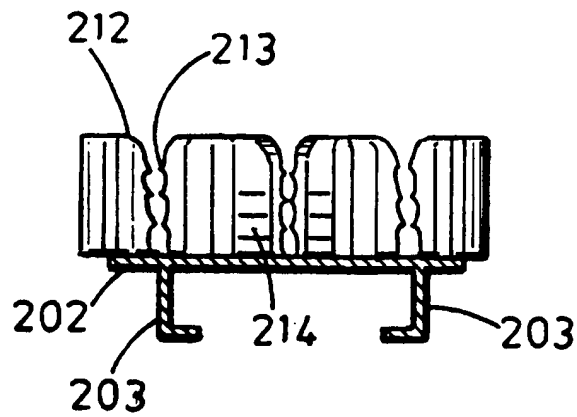


FIG. 8

SPACERS

The present invention relates to spacers as used in the building and construction industries in the production of reinforced concrete structures.

More particularly, spacers are used for locating metal reinforcing bars (or grids comprised of such bars) in the desired position with respect to shuttering prior to the pouring of concrete which embeds both the reinforcement and the spacers.

Conventionally, spacers are tied by wire to the reinforcement bars. This is a time consuming operation and it has previously been proposed in GB-A-2 206 619 to produce spacer assemblies comprising a moulded plastics support head incorporating a clip which is a push fit into the reinforcement bar and a spacer body for providing the required "cover" distance between the bar and the shuttering.

There is however a disadvantage with the spacer assemblies of GB-A-2 206 619 in that any one support head is only capable of being mounted on a bar of a particular cross-sectional size (or narrow range of such sizes). It is therefore necessary to provide different support heads for each cross-sectional size of bar likely to be encountered. This requires a considerable investment in the moulds required to produce the necessary range of support heads.

It is therefore an object of the present invention to obviate or mitigate the abovementioned disadvantages.

According to a first aspect of the present invention there is provided a support head for use in locating a spacer body on a reinforcement bar, the head comprising

- (i) means for locating a spacer body on the head, and
- (ii) first and second bar location means each adapted to locate the head on

a bar of different cross-sectional size, and in a direction transverse to, that of the other such location means.

According to the second aspect of the present invention there is provided a spacer assembly comprising a support head as defined in the previous paragraph mounted on a spacer body.

Thus, support heads in accordance with the invention are capable of being attached to bars of different cross-sectional sizes. As such, the number of heads required to cater for the full range of reinforcement bar sizes used in the construction industry is considerably reduced as compared to heads which are capable of accommodating only one such size.

In a preferred embodiment of the invention, the support head comprises at least one further bar location means (e.g. a total of three or four such means) such that each location means is adapted to locate the head on a bar of different cross-sectional size, and in a direction transverse to, that of the other such location means.

The support head of the invention may be such that there may be a bar located in only one of the bar location means at any one time (i.e. the head is not capable of being simultaneously mounted on two or more bars). Such heads may comprise a bar location zone through which either a bar located by one of the location means or (but not simultaneously) a bar located by another of the location means may extend. Support heads of this type are useful where it is desired to attach the spacer body to only a single bar.

Alternatively support heads in accordance with the invention may be such as to be mountable on different size bars at a junction of such bars in a reinforcement grid.

In one embodiment of the invention, at least some of the bar location means comprise at least one (and preferably an aligned pair of) resilient retaining means which is a push fit onto a bar of the appropriate cross-sectional size. The resilient retaining means may, for example, be a clip, or a jaw arrangement.

Alternatively at least some of the bar location means may comprise flexible strap and associated fastener means therefor (e.g. a buckle type arrangement) whereby the strap can locate around a bar and be fixed to the associated fastening means so as to secure the head in position on a bar. The strap may have transverse ribs arranged so that the strap may be passed into the fastening means but not withdrawn therefrom.

A particularly preferred embodiment of support head for use in the invention comprises an open-topped hollow body (e.g. cylindrical) in the wall(s) of which are formed bar receiving formations which provide or which are associated with said bar location means, said body having a base on which is provided (on its surface opposite the body wall(s)) the means for locating a spacer body on the head.

In this embodiment, at least some of the bar receiving formations may comprise a pair of aligned jaw formations formed in the body wall(s) and it is these jaws which provide the bar location means. Each such jaw formation may comprise a pair of flexible leaves formed in the material of the wall and arranged to grip a bar of a particular size located in the jaw formed by the leaves. Each leaf may have teeth and/or ribs to assist in retaining the bar in the jaw.

The wall of the body may alternatively or additionally have at least one pair of aligned (non-gripping) bar receiving formations (e.g. for accommodating a bar or relatively large cross-sectional size) and the head is associated with retaining means (e.g. a flexible strap and buckle arrangement) for retaining a bar in said formation).

The head is preferably fabricated of plastics material, but may alternatively be produced from metal, wire or spring steel.

It is highly preferred that the head is removably mountable on a spacer body. As such it is possible to produce clips and a support range of spacer bodies for providing a range of "cover" distances. It is therefore possible to assemble a range of support head/spacer body combinations to allow for (a) attachment to a bar of particular cross-sectional size, and (b) the desired cover distance. It will be appreciated that this is a considerable advantage as compared to producing spacer assemblies comprising one clip size immovably mounted on a spacer body of a particular cover distance.

To provide for removable mounting of the support head on the spacer body, the former may (for example) have a keyway which may be formed by a pair of opposed channel shaped formulations in which complementary ledges of the spacer body are slidably received.

The spacer body will, for preference, be of concrete or other cementitious material but may alternatively be of a plastics material (particularly a rigid plastics material).

If desired, the spacer body may be provided with a roller or skid so that the body is capable of sliding easily into difficult locations such as pile casting sleeves or complex factory moulds.

As a further feature of the invention, the support head may be adapted to carry various components which may need to be incorporated in the final reinforced concrete structure, e.g. cathodic anti-corrosion strips.

The invention will be further described by way of example and with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a first embodiment of spacer assembly in accordance with the invention;

Figure 2 is a plan view of the spacer assembly of Figure 1 showing details of the support head thereof;

Figure 3 is a plan view of a second embodiment of support head;

Figure 4 is a perspective view of a third embodiment of support head in accordance with the invention;

Figure 5 is a plan view of the support head of Figure 4;

Figure 6 is a detail of a bar-receiving formation in the head of Figure 4;

Figure 7 is a plan view of a fourth embodiment of support head;

Figure 8 is a side view of the head of Figure 7; and

Figure 9 is a side view of a spacer body.

The spacer assembly illustrated in Figure 1 comprises a support head 2 on which is removably mounted a spacer body 3.

The head 2 is a one-piece moulded plastics article formed as a rectangular platform 4 on which are located a first pair of aligned clips 5 and a second pair of aligned clips 6 set at right angles thereto. Clips 5 are provided adjacent two of the

opposed edges of platform 4 whereas clips 6 are provided adjacent the other opposed edges. A bar location zone 7 is shown as being defined within the area bounded by clips 5 and 6.

The support head 1 is intended for location on one or other (but not simultaneously both) of bars two different cross-sectional sizes. As such, clips 5 are designed to be a resilient push fit onto a bar of lower cross-sectional size than may be accommodated (also by resilient push fit) by clips 6.

A bar located on clips 5 or clips 6 extends through bar receiving zone 7. The disposition of clips 5 and 6 is, as indicated, such that only one bar may extend through the zone 7 so that the illustrated support head may be mounted (by appropriate orientation of the head) on either a bar of relatively small cross-sectional size (by clips 5) or a bar of relatively large cross-sectional size (by clips 6) but not both.

For the purposes of mounting the head 2 on spacer body 3, the platform 4 is provided with keyway provided by a pair of depending, opposed L-shaped flags 8 defining channel shaped formations in which ledges 9 of the spacer body are slidably received.

A second embodiment of support head 10 is illustrated in Figure 3 and is similar to head 2 in that it incorporates a pair of aligned clips 5 for accommodating a bar of relatively small diameter. However, for the purposes of being located on a bar of relatively larger diameter, head 10 is provided with a pair of flexible plastics straps 11 which may be secured in respective buckles 12. Thus straps 11 may be passed around a bar and then secured in a buckle to locate the head on the bar. Straps 11 and buckles 12 are positioned so that the orientation of the head to secure it on a bar of relatively large cross-sectional size would be at right angles to that for securement on a bar of relatively small cross-sectional size.

Support head 10 may be used in a number of ways, namely:

- (a) for mounting exclusively on a bar of relatively small cross-sectional size (by means of clips 5);
- (b) for mounting exclusively on a bar of relatively large cross-sectional size (by means of straps 11 and buckles 12); and
- (c) for mounting on a grid at the junction of a bar of relatively small cross-sectional size (by means of clips 5) and a bar of relatively large cross-sectional size (by straps 11 and buckles 12).

Reference is now made to Figure 4 which illustrates a third embodiment of spacer head 100 in accordance with the invention. This head comprises a generally cylindrical, open-topped body 101 having a base 102 on the lower side of which are provided opposed L-shaped flanges 103 which together define a keyway whereby the head 100 may be selectively removably mounted on any one of a number of spacer bodies providing various cover distances.

The wall of body 101 is formed so as to have six equiangularly spaced bar-location formations 104-109. More particularly, the formations 104 & 107 and the formations 105 & 108 are provided as aligned pairs of bar-gripping jaws whereas the formations 106 & 109 are provided as an aligned pair of bar-receiving slots which are not adapted to perform a gripping function.

A further feature of the illustrated head 100 is the provision of strengthening ribs 110 on the inner surface of the body 101.

Each bar-gripping jaw of Figure 4 is defined by a pair of flexible leaves 111 which form part of the main wall of the hollow body 101 but which are separated

from the base 102 thereof by undercuts 112 whereby the leaves 111 may flex outwardly of the body. Each such leaf is provided as shown with a set of bar-gripping teeth 113 adapted to inhibit or prevent withdrawal of a bar located in the respective jaw. Each leaf is further provided with a set of gripping-ribs 114 to assist in retention of a bar in the jaw.

It will be appreciated that a bar is located in an aligned set of jaws 104 and 107 or in the aligned set 106 and 109 simply by orientating the head 100 so that the bar is at the mouths of the jaws and the head is then push fitted onto the bar. Removal of the head 100 from the bar is prevented, or at the very least inhibited, by the teeth 113 and ribs 114.

It will be appreciated that when a bar is gripped by the aligned jaw pairs 104 and 107 or 106 and 109 the leaves 110 (of the respective jaws) flex outwardly of the body 101.

The aligned bar-receiving formations 105 and 108 are somewhat different from the other formations of the head and serve simply to receive (without gripping) a large-diameter bar (i.e. larger than could be accommodated by the aligned gripping jaws). The nature of the bar-receiving formation 105 is illustrated in Fig. 6. A bar received within aligned formations 105 and 108 is intended to be retained in position by a plastics strap 116 which is mounted on the external surface of the body 101 between formations 106 and 107 and which is intended for location in a buckle 117 (see Fig. 5) provided on the outside of the body 101 between formations 104 and 109. Strap 116 and buckle 117 are provided at the lower ends of respective slots 118 and 119 formed in the wall of body 101. Thus with a bar located in formations 105 and 108 the strap 116 may engage over the top of the bar (the strap being located, of course, in slab 118 and 119) and be fastened in the buckle 117. Strap 116 has a plurality of transverse ribs 116a such that when the leading end of the strap 116 is drawn through the buckle 117 the strap is retained therein and cannot be withdrawn.

The centre-lines in Fig. 5 illustrate the manner in which bars of different cross-sectional size are received within the body 101 although it will be appreciated that the head 100 may only be located on one such bar.

Reference is now made to Figs. 7 and 8 which illustrate a fourth embodiment of spacer head 200 in accordance with the invention. This head comprises an open-topped generally cylindrical body 201 having a base 202 on the lower side of which are opposed L-shaped flanges 203 which together define a keyway.

The periphery of body 201 is formed so as to have eight equiangularly spaced pairs of bar-gripping jaws 204-211 arranged in the following four sets of aligned pairs, namely:

205 and 209

206 and 210

207 and 211

204 and 208

Each such aligned pair is capable of accommodating a reinforcement bar of a particular size range so that, overall, the head is capable of being mounted on bars having diameters in the range 2.5 to 12 mm.

Each of the Jaws 204-211 comprises a pair of leaves 212 which are integral with the body 201 but which are moulded so as to project outwardly therefrom. In other respects, the jaws 204-211 are similar to jaws 104-105 and 107-108 (described with reference to Fig. 4) in that they have bar-gripping teeth 213 and bar gripping ribs 214. As with the embodiment of Fig. 4, circumferentially spaced strengthening ribs 215 are provided on the inner surface of body 201.

It will be appreciated that the illustrated head 200 is capable of being located on any one of four different bar sizes simply by orientating the head 200 such that the appropriate pair of jaws is aligned with the bar. The head may then simply be push fitted onto the bar.

It should be appreciated that a number of modifications may be illustrated to the head illustrated in Fig. 7. Thus, for example, the head may comprise a different number of pairs of aligned jaws, e.g. three aligned pairs rather than the four illustrated in Fig. 4.

Reference is now made to Figure 9 which illustrates a spacer body 300 provided with a roller 301 such that the body when mounted on a reinforcing bar by a support head of the type described allows the reinforcement to be slid easily into a difficult location such as a pile casting sleeve or a complex factory mould.

CLAIMS

1. A support head for use in locating a spacer body on a reinforcement bar, the head comprising
 - (i) means for locating a spacer body on the head, and
 - (ii) first and second bar location means each adapted to locate the head on a bar of different cross-sectional size, and in a direction transverse to, that of the other such location means.
2. A support head as claimed in claim 1 comprising at least one further bar location means such that each location means is adapted to locate the head on a bar of different cross-sectional size, and in a direction transverse to, that of the other such location means.
3. A support head as claimed in claim 2 having three bar location means.
4. A support head as claimed in claim 2 having four bar location means.
5. A support head as claimed in any one of claims 1 to 4 wherein at least some of the bar location means comprise at least one resilient retaining means which is a push fit onto a bar of the appropriate cross-sectional size.
6. A support head as claimed in claim 5 wherein at least some of the bar location means comprise an aligned pair of said resilient retaining means.
7. A support head as claimed in claim 5 or 6 wherein said retaining means comprises a clip.

8. A support head as claimed in claim 5 or 6 wherein said resilient retaining means comprises a jaw arrangement.
9. A support head as claimed in any one of claims 1 to 8 wherein at least some of the bar location means comprise a flexible strap and associated fastener means therefor whereby the strap can locate around the bar and be fixed to the associated fastening means so as to secure the head in position on a bar.
10. A support head as claimed in any one of claims 1 to 4 comprising an open-topped hollow body in the wall(s) of which are formed bar receiving formations which provide or which are associated with said bar location means, said body having a base on which is provided (on its surface opposite the body wall(s)) the means for locating a spacer body on the head.
11. A support head as claimed in claim 10 wherein at least some of the bar receiving formations comprise a pair of aligned jaw formations formed in the body wall(s).
12. A support head as claimed in claim 11 wherein each jaw formation comprises a pair of flexible leaves formed in the material of the wall.
13. A support head as claimed in claim 12 wherein each leaf has teeth and/or ribs to assist in retaining the bar in the jaw.
14. A support head as claimed in any one of claims 10 to 13 wherein the wall of the body has at least one pair of aligned (non-gripping) bar receiving formations associated with said bar location means.
15. A support head as claimed in any one of claims 1 to 14 fabricated of plastics material.

16. A support head as claimed in any one of claims 1 to 15 which is removably mountable on a spacer body.
17. A support head as claimed in claim 16 having a pair of opposed channel shaped formations for slidably receiving complementary ledges of a support body.
18. A spacer assembly comprising a support head as defined in any one of claims 1 to 17 mounted on a spacer body.
19. A spacer assembly as claimed in claim 18 wherein the spacer body is provided with a roller.
20. A support head for use in locating a spacer body on a reinforcement bar substantially as hereinbefore described with reference to Figures 1 and 2 or Figure 3 or Figures 4 to 6 or Figures 7 to 8 of the accompanying drawings.
21. A spacer assembly substantially as hereinbefore described with reference to Figures 1 and 2 or Figure 3 or Figures 4 to 6 or Figures 7 to 8 of the accompanying drawings.



Application No: GB 9617984.1
Claims searched: 1-21

Examiner: Robert Fender
Date of search: 29 October 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): E1D: DPR

Int Cl (Ed.6): E04C: 5/16

Other: -

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 1043279 (RAPID METAL DEVELOPMENTS) whole document is relevant; see figs.1-3 and page 2 lines 41-64 in particular	1-8,10,11 15,16,18
X	GB 1272869 (N.V. KUNSTSOFFENINDUSTRIE ATTEMA) see figs.1-5	1,2,10,14 15,16,18

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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